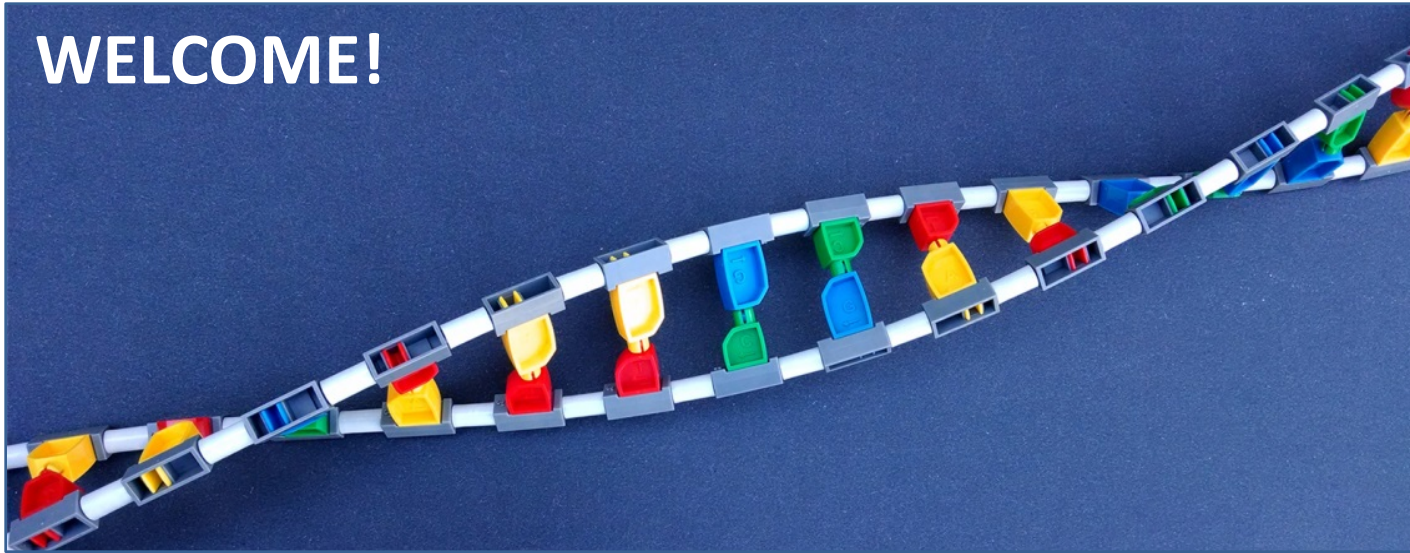


WELCOME!



SEPT Workshop on June 29, 2016

***A New Twist in Genetics Instruction:
Manipulatives for Teaching Cell Processes***

Kathleen Vandiver, PhD. Cell Biology; Ed.M

Amanda Mayer, PhD., and Shanthi Ravi

Center for Environmental Health Sciences and The Edgerton Center

MIT, Cambridge, MA

Workshop Goals

1. Introduce the MIT models for DNA, mRNA, Protein & tRNA molecules

- They are designed to show what molecules do!
- Not just what they look like.

2. Teach Basic Molecular Biology

- Refresh or update biology facts for you.
- Help you to see the major concepts more clearly.

3. Provide Interesting Health Connections in Biology

- Increase your knowledge about DNA

Introduce yourself to the group and then answer a question...

- Questions are on strips of paper.
- Give your name and school. And what you teach.
optional: provide a interesting fact about your school.
- Read the question out loud from the paper
and give it a try --even if you are not sure!

Begin with Question 1. Next slide has the answer.

1) What *is* Environmental Health Science?

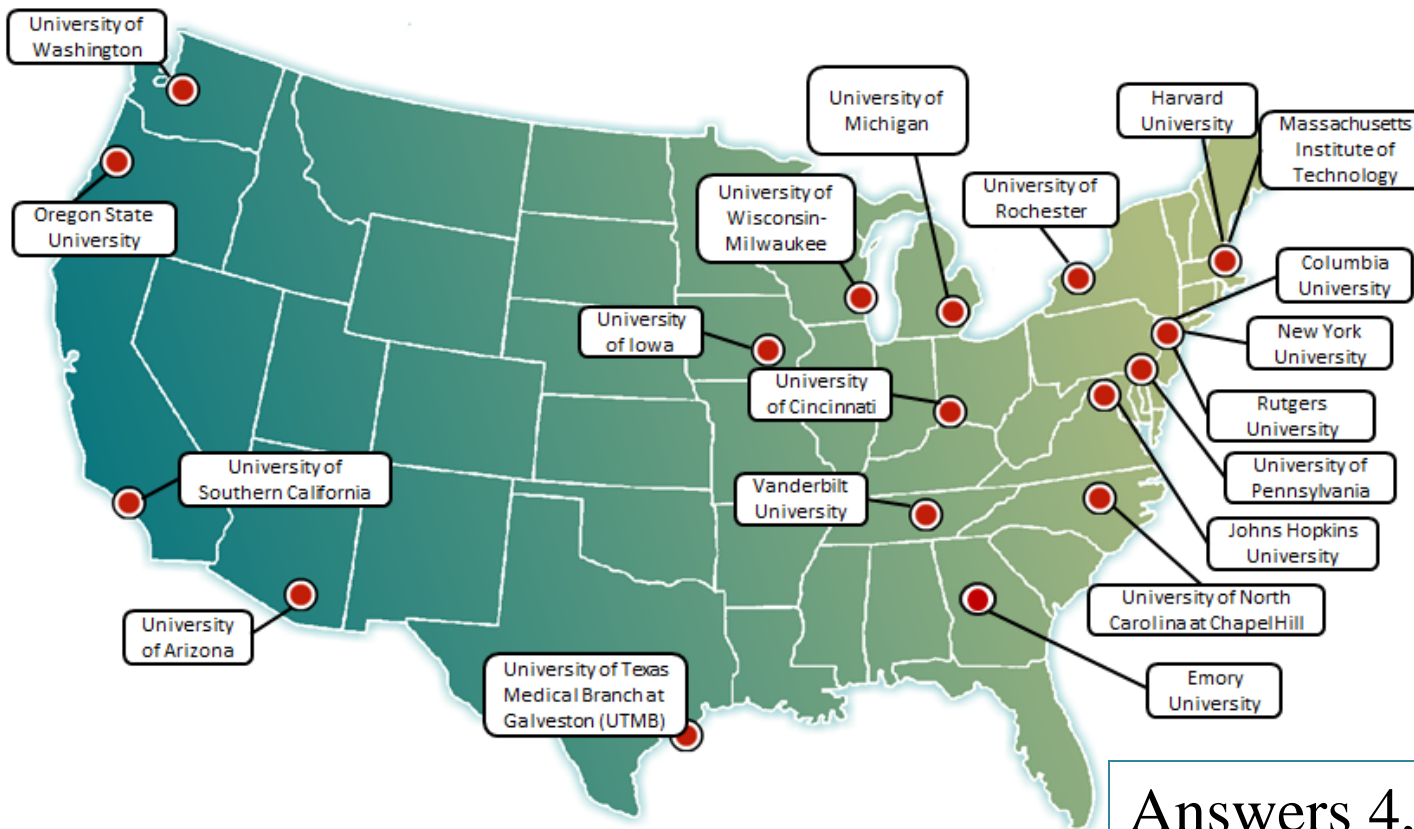
Environmental Health Science deals with all factors in the environment that may affect a person's health.

Question 1

Ask for question 2 and 3. Next slide has the answers for 2 and 3.

2) Who funds the Centers for Environmental Health Science? and 3) how many Centers are there?

- N.I.H. National Institutes of Health
NIEHS National Institute of Environmental Health Science
- There are about **20** Environmental Health Science Centers scattered around the country



Answers 4, 5, 6 are next.

What are some examples of environmental health problems?

Questions 4, 5, and 6

Three of my examples:

- arsenic in the ground water
- lead in the air
- mercury in food

Ask for Questions 7, 8, 9 next.

7) 8) & 9)

Environmental health effects are influenced by 3 key factors:

Questions 7,8,9

- **Nature of the exposure**
(time duration, route of exposure, concentration,)
- **Genetic makeup** of the subject
- **Condition and behavior** of the subject. *(children)*



Ask for Question 10. Go to next slide for answer 10.

Name the 3 routes of exposure. (How toxins can enter the body.)

Question 10

- Through the respiratory system
- Through the digestive tract
- Through the skin

Ask for question 11. Next slide is answer to question 11.

“The dose makes the poison...”

- Give an example of an ordinary thing that can be deadly at high concentrations...

Question 11

- Alcohol
- Salt
- Aspirin

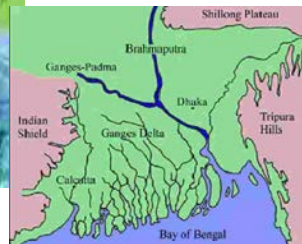


Ask for question 12. Next slide is the answer to 12

Where in the world is arsenic poisoning prevalent?

Bangladesh Question 12

- Arsenic poisoning



- The well water has high levels of natural arsenic

Ask for question 13. Next slide is the answer to question 13

Does a typical cell in the human body require DNA repair?

Question 13

- Yes, a typical cell must repair its DNA 10,000-100,000 times
.....PER DAY!

Ask for Question 14. Next slide is the answer to 14.

Sunlight damages skin cells. What part of the cell is affected by UV rays?

Question 14

- DNA molecules are damaged.
- If the cell's DNA can not be repaired, it enters a programmed cell death pathway called apoptosis. When apoptosis causes skin cell death we call it "sun burn."

Ask for Question 15. Cancer rates melanomas. ok to show next.

The annual incidence of melanoma in American men between the 1970s and 1990s ...

Question 15

- Stayed the same
- Doubled
- Tripled
- Increased slightly

Next slide has answer 15. Has more info on cancer rates, too

Mens' rates ~Tripled!

6.7 per 100,000 individuals increased to 19.3 per 100,000

Women's rates ~Doubled 5.9 to 13.8 over the same time. Question 15



More recent reports: Rates still increasing for women. Men's have level' s off (2008 NCI bulletin)

Next ask for question 16. Answer is on next slide.

Why is Environmental Health Science Important for Everyone?

- Many negative effects which can cause disease can be prevented by education and action.
- Example: Incidences of melanomas in young people are on the rise. Using sun screen, hats, etc. prevents skin cancer



ewg

Know your environment.
Protect your health.

ENVIRONMENTAL WORKING GROUP website for sunscreen facts:

EWG.org

Ok to end here. (Additional questions available.)

WILD CARD

(Opinion Question!)

Question 17

- “Just as there are laws that prohibit the sales of cigarettes to teenagers, there should be laws that restrict the use of indoor tanning equipment by those younger than 18.”
- What’s your first reaction to this? Agree or Disagree? (Your answer is always right-- as it is your opinion! 😊)

Ask for Question 18

WILD CARD

(You will provide a Second opinion to this question!)

Question 18

- “Just as there are laws that prohibit the sales of cigarettes to teenagers, there should be laws that restrict the use of indoor tanning equipment by those younger than 18.”
- What’s your first reaction to this? Agree or Disagree? (Your answer is always right-- as it is your opinion! 😊)

Ask for Question 19

WILD CARD

(on my interests!)

Question 19

- “An Environmental health problem I would like to learn more about is...”

(Additional questions available.)

Last-but-not-least-questions

Questions 20, 21, 22, 23.

- “An environmental health problem I would like to learn more about is....”
- “Describe an environmental health problem in air, water or soil that occurred in your state or on the news.”
- “Describe an environmental health problem that is a world-wide problem.”
- “Think of a pollution problem that once was really awful but that has been cleaned up or isn’t a problem anymore.”

End of Intro PPT

Introduce yourself to the group and then answer a question...

- Question #..... **This is the format slide**
- Give your name and the school where you work.
Tell why you enjoy teaching ...or ...some fact about your school
- Read the question out loud from the paper
and give it a try --even if you are not sure!

Don't advance slide until # question about _____ is answered...